RECORDS MANAGEMENT APPLICATION SOFTWARE PILOT PROJECT:

FINAL EVALUATION

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INTRODUCTION

Networked digital media are in widespread use in government agencies in the United States. While they enable significant business process improvements, they also engender serious records management concerns. Most organizations' file management and record keeping methods were developed for paper-based record material and are being rendered obsolete or ineffective by electronic media. However, new records management application (RMA) software has the potential to improve the efficiency and accountability of business processes that rely on digital media.

For this reason, the Records and Forms Management Division in Michigan's Department of Management and Budget (DMB) took the lead in introducing and evaluating RMA software—ForeMost—on a pilot project basis among employees in DMB's former Office of Support Services (OSS).

This report provides a final evaluation of efforts to incorporate RMA software into ongoing work practices among a subset of trial users over a year's time. Complementing findings from pre-pilot and mid-pilot studies, the results are expected to provide lessons learned and to inform future strategies for development of electronic records management practices as well as for implementation of RMA software.

In what follows, a project evaluation overview is provided, and participants and procedures for the final assessment effort are described. Findings are presented next, and a discussion section concludes the report. Earlier baseline and interim pilot study reports are available on the project web site.

EVALUATION APPROACH

Overview

The evaluation relied on a combination of quantitative and qualitative methods to gather information about a wide variety of organizational context characteristics, task activities, information-handling practices and computer support for these, as well as expectations for and experiences with the new RMA software. A baseline survey, administered late in 2000 before prospective pilot users had been introduced to the software, sought standardized data in these areas. These quantitative data were complemented by qualitative data gathered in semi-structured interviews with a subset of future users as well as with the RMA pilot project team.

Pilot project participants were trained to use the new RMA software over a three-month period (December 2000 through February 2001). At the mid-point of the one-year trial period, a second round of interview data were collected to tap users' early experiences with the software, implementation processes, and training and help support. Besides providing the project team with insights into what was working well or badly from users' perspectives, the findings supplied useful input to the post-pilot survey instrument. At the end of the trial period of use, in January 2002, a final set of quantitative evaluation data were collected. This report gives greatest attention to the final round of data collection; where relevant, however, it makes comparisons with findings from the baseline or interim studies.

Participants

The participant pool for the surveys comprised all employees in DMB divisions expecting to take part in the pilot trial of the RMA software. At the time of the baseline survey, the total pool included 63 employees distributed over five divisions and varied job levels. Among them, a subset of 12 took part in pre-pilot interviews; interim qualitative data were also sought from 12 pilot participants, 6 previous interviewees and 6 who had not been interviewed before.

For the post-pilot survey, the eligible participant pool included 70 employees at varying job levels. However, changes in the organization of the Department resulted in divisional arrangements different from those that characterized the baseline survey environment.

Procedures

Both baseline and post-pilot questionnaires comprised a series of close-ended items that required 20 to 30 minutes to complete. The post-pilot instrument repeated a substantial number of questions from the baseline survey instrument to permit pre-post comparison of responses. Moreover, the final instrument contained a number of additional evaluative items that focus specifically on experiences with the ForeMost RMA software and its effects on work.

Questionnaires were mailed by the pilot project team to respondents and returned, without identifying information, for data entry. Data analyses were carried out by external consultants to the pilot project using a standard statistical software package (SPSS). Findings from these analyses are presented below in an order that parallels the organization of the questionnaires.

Qualitative information was collected in semi-structured interviews by an external consultant to the project. These discussions took from 45 minutes to an hour and a half, averaging about an hour in length. Individual interviews with users were supplemented by four group interviews with representatives of the project team, two at baseline and two during the interim evaluation. Qualitative findings will be referenced, where relevant, for interpretive or illustrative purposes. However, because no qualitative data were gathered as part of the post-pilot assessment, this final report emphasizes quantitative evaluation results.

FINDINGS

Description of Respondents

There were 26 respondents to the final quantitative survey, representing a 37 percent response rate. Table 1 shows the distribution by job type. Managers make up over half the sample, while about 11 percent are analysts. The remainder are engaged in varied support-level jobs (e.g., administrative assistants, tradespersons).

Table 1

Job Type	Frequency	Percent
Managerial	15	57.7
Analyst	3	11.5
Other	8	30.8
Total	**26**	**100**

Table 2 shows the distribution of participants by divisions in the restructured Department. As is evident, the largest subset of survey participants by far comes from the records management division.

Table 2

Division	Frequency	Percent
Administration	1	3.8
Operations	4	15.4
Records Management	11	42.3
Acquisitions, Logistics	3	11.5
Other	7	26.9
Total	**26**	**100**

Differences between the pre-pilot and post-pilot samples of respondents are noteworthy in many respects. With respect to job level, managers comprise over half of both samples. However, the post-pilot sample includes a much smaller proportion of analysts and a much greater proportion of support staff. Comparisons between the pre- and post-pilot samples based on divisional representation are harder to draw because of the Departmental reorganization. It is worth noting that for the baseline survey, only 25 percent of respondents came from the records management department; in the final assessment, they comprise over 40 percent of the total sample.

The greatest and most troubling difference between the two sets of participants, however, has to do with sample size and response rate. At baseline, 48 questionnaires were returned, representing a 76 percent response rate. The reduced number and dramatically smaller response rate for the final survey mean, first, that the results cannot be assumed to represent the views of the broader set of pilot project participants (rather than only those of the minority who chose to respond). Second, they preclude the drawing of meaningful statistical comparisons between pre- and post-pilot data; it would not be possible to decide, for instance, whether differences (if found) should be attributed to real changes in work practices as a function of the new electronic records management system or rather to selection artifacts (a function of differences in respondent characteristics).

In what follows, then, only descriptive data are presented, typically as frequencies and percentages or else as means and standard deviations. Conclusions drawn from them should be interpreted cautiously with these methodological limitations in mind.

Information Work

After providing brief background information, survey respondents were queried about the frequency with which they engage in work that involves the preparation, sharing or use of information. For this purpose the questionnaire listed 16 different information tasks and asked participants to indicate how

often they occurred in a typical work week; these same items formed part of the baseline survey. Responses were collected as ratings on 5-point scales (where 5 = very often or always and 1 = rarely or never). Table 3 gives the mean responses (and standard deviations) for each.

Table 3

Information Tasks	Mean	Standard Deviation
Write memos or letters	2.9	1.3
Write reports or long documents	2.5	1.3
Edit or format others' work	2.3	1.3
Develop or revise forms	2.0	1.2
Fill out forms	2.3	1.1
Create or maintain spreadsheets	3.0	1.6
Use spreadsheets	3.0	1.2
Create or maintain word processed files	2.8	1.4
Use word processed files	2.5	1.1
Keep activity logs, other records	2.7	1.2
Provide administrative support	2.5	1.5
Analyze data (e.g., budgets)	2.4	1.3
Do programming or statistical computation	1.7	1.0
Create or use graphs, charts	1.8	1.1
Locate or retrieve existing information	3.3	1.5
Assemble documents	2.5	1.4

As is shown in Table 3, the most frequent information work for participants in the post-pilot assessment involves creating, maintaining and using spreadsheets as well as engaging in other kinds of information search and retrieval tasks. Such tasks had formed a less prominent part of work for the average baseline survey respondent. In contrast, baseline respondents reported more frequent engagement with document development (e.g., writing reports) and data-based activities (statistical computation, data analysis) than participants in the final survey. These differences, while not large, are probably reflective of differences in respondent characteristics; for instance, analysts do significantly more data-based work than those in other job categories; but they are underrepresented in the post-pilot survey sample.

Data were gathered about types of information tasks being done because the new RMA software might differentially help or hinder different functions. Qualitative data gathered at the mid-point of the project suggested that the utility of RMA software could also vary depending on other key aspects of information work—for instance, the extent to which it requires interactions with external "customers," generates official transactions, contributes to a production-like business process, or involves official documents. In the final survey, therefore, respondents were additionally asked to indicate how salient a role these features play in their jobs.

Table 4

Key Aspects of Work	Mean	Standard Deviation
Interactions with external customers	4.5	1.0
Official transactions (e.g., orders)	3.8	1.3
Production-like business processes	4.2	1.2
Creating or using official documents	3.4	1.3

The answers, collected using 5-point rating scales (where 5 = very important role and 1 = no important role), are summarized in Table 4. The mean ratings suggest that these aspects of information work play fairly prominent roles in the jobs of post-pilot respondents. Such participants would therefore be expected to gain considerable advantage from access to a well-working electronic records management system.

Managing Electronic Information

As explained in the introduction, when employees carry out more and more of their work using networked computers, organizations become increasingly concerned that practices inherited from the typewriter and paper mail era are not adequate for managing electronic records. RMA software is intended to address this challenge. Thus in both the pre- and post-pilot questionnaires, respondents were asked a number of questions about their practices for managing digital material of potential record value.

Table 5 shows the extent of digital material saved in relation to how it entered a user's electronic environment. Questions were asked in terms of proportions (e.g., proportion of sent email saved); responses were collected as quintiles (e.g., 0-20 percent, 21-40 percent, and so on); then they were converted to 5-point scales for ease of comparison with data from other questions. Responses are provided for both the pre-pilot and post-pilot evaluations.

Table 5

Electronic Information Handling	Post-pilot		Pre-pilot	
	Mean	Standard Deviation	Mean	Standard Deviation
Saving sent email	3.7	1.5	2.1	1.2
Saving received email	3.4	1.5	2.3	1.3
Saving other electronic records	3.0	1.5	2.9	1.5

Interestingly, a comparison of pre- and post-data in Table 5 suggests that the introduction of RMA software might have led to increased saving of material sent or received by e-mail (vs. digital material prepared and shared in other ways). Although the methodological limitations outlined in the procedures discussion make it clear that such inferences are subject to considerable uncertainty, qualitative data support the notion that the pilot project drew attention to the previously under-recognized potential of email to generate material of record.

Having inquired about whether digital material is saved, the questionnaire then sought to learn how it is stored—what proportion, for example, is printed and stored in paper file cabinets vs. stored in electronic form. As before, questions were posed in terms of quintiles and responses were converted to 5-point scale data. Table 6 shows pre- and post-pilot responses to these electronic records management queries.

Table 6

Electronic Information Storage	Post-pilot		Pre-pilot	
	Mean	**Standard Deviation**	**Mean**	**Standard Deviation**
Store only in ForeMost	3.0	2.2	Not applicable	
Store only in other electronic form	2.3	1.9	2.6	1.6
Store only as paper	3.0	2.3	1.9	1.3
Store both as paper and electronic	2.8	2.0	2.2	1.4

Again, methodological limitations generate well-founded uncertainty about the implications of comparisons between pre- and post-pilot responses. It is tempting, however, to infer that pilot project participants are now storing more electronic material than they did before—and doing so in paper, in electronic form, and in both media.

When asked how hard or easy it is to locate electronic records saved within the past 6-12 months, post-pilot survey respondents judged it to be fairly easy (mean = 3.9 on a 5-point rating scale, where 5 = very easy). Electronic records over a year old—and thus created before the introduction of ForeMost—were judged only a little more difficult to retrieve (mean = 3.5). These responses do not differ from those provided to the same series of questions on the baseline survey.

Focus on ForeMost

Preceding sections of this report treat diverse but generic facets of information work and electronic records management practices. The sections that follow focus directly on experiences with ForeMost, ranging from preparatory and pre-rollout activities through training and user assistance to functionality of the RMA software features in use and effects of use on business processes.

Pre-Rollout Activities

Previous studies of efforts to implement new computer-based technologies in organizational settings have found that support from top-level management and user participation are two variables strongly associated with successful outcomes. Therefore the post-pilot survey asked respondents how supportive their organization's top level management had been toward the development and deployment of ForeMost software. It also asked how highly involved users had been in those same activities. Answers were provided on 5-point rating scales.

Pilot project participants judged top-level management to be only moderately supportive of the ForeMost initiative (mean = 3.2). Further, they did not think users had been very much involved in the development and deployment of the RMA software (mean = 2.5). These assessments are less positive than those rendered in response to more general questions asked in the baseline survey about how supportive top-level management typically is toward information system advances (mean = 3.9) and about the usual degree of user involvement (mean = 3.0).

Before ForeMost software could be introduced for use by DMB employees, they needed to have a file plan in place. Thus a critical pre-rollout activity for the project team was to work with users to develop their file plans. When asked how hard or easy it was to develop their first file plan, post-pilot survey respondents gave that effort an intermediate difficulty rating (mean = 2.9, where 5 = very easy and 1 = very hard).

However, initially devised plans did not always meet their work needs very well (mean = 2.5, where 5 means that needs are very well met). In all, 15 (or 58 percent) of the pilot project participants experienced needs to modify their file plans. At the time of the post-pilot survey, however, only 6 had succeeded in making the desired changes to arrive at a satisfactory file plan.

File plans are required so that there are systematic ways to store and retrieve electronic records. Another important question to survey participants, then, was the extent to which they believe they understand what an electronic record is. Responses suggest that most users do not understand this concept very well—on a 5-point scale, 46 percent of respondents (12) circled the lowest scale value.

Training and Assistance

With the arrival of the ForeMost software, a variety of training activities became available to pilot project participants. The post-pilot survey asked about the effectiveness of these learning techniques. Responses were solicited on 5-point rating scales (where 5 = very effective and 1 = not very effective). They are summarized in Table 7.

Table 7

Learning Techniques	Mean	Standard Deviation
Classroom training session	2.8	1.5
Individual visits from project members	3.7	1.3
Listserv and guides from the project	2.7	1.4
Experimentation, trial and error	2.8	1.3

As the means in Table 7 show, one-on-one coaching by project team members was perceived as by far the most effective learning technique. This finding is consistent with qualitative data gathered for the interim evaluation. At that point, the provision of individual follow-up help after initial training was highly valued. Proactive help ("I'll be in your building today—is there anything I can stop by and help you with?") also got especially high marks from interviewees.

In addition to training questions, the post-pilot survey inquired where participants turned for help when they encountered difficulties using ForeMost. Table 8 lists some common help sources and presents users' first and second choices among them.

Table 8

Help Sources	1st choice	2nd choice
Call a project member	12	1
User manual	3	5
Online help in ForeMost	1	7
ITSD help desk	0	1
Knowledgeable co-worker	8	7

In view of their positive experiences with individualized coaching, it is not surprising to learn that most respondents' first choice for getting help when things go wrong is a phone call to a project team member. The next most popular choice is a knowledgeable co-worker. At the time of the interim evaluation, the project team had designated "superusers" in each of the participating Divisions to explicitly recognize and support local sources of collegial assistance. The Department-level technical help desk (ITSD), in contrast, was rarely contacted for solutions. These results are consistent with findings from most studies of user support.

In spite of their positive assessments for individualized training and help support, participants did not rate their own understanding of the RMA software very highly. The final survey asked about participants' knowledge of the ForeMost functions most relevant to their day-to-day work. On a 5-point scale (where 5 = very complete knowledge and 1 = very limited knowledge about this application), the mean response was well below the intermediate point (2.6).

Experience with ForeMost

In previous research on the implementation of new technologies, standard success measures include extent of use (where use is optional rather than mandated) and user satisfaction with the capabilities provided by the tools that have been introduced. The final evaluation survey for the ForeMost pilot project included both types of measures.

First, survey respondents were asked to indicate how often, if at all, they used ForeMost in the course of their work. Their answers are presented in Table 9.

Table 9

Use of ForeMost	Frequency	Percent
At least daily	6	23.1
At least weekly	3	11.5
At least monthly	2	7.7
Less than once a month	5	19.2
Not at all	10	38.5
Total	**26**	**100**

As the data in Table 9 show, the distribution of responses is bimodal but weighted toward the infrequent end of the usage dimension. Specifically, 10 respondents (over 38 percent) say they simply do not use ForeMost; another 5 (nearly 20 percent) report using it less than once a month. Qualitative data collected in interim interviews suggest that these trained participants experiment with the software from time to

time, even attempting some real tasks on a trial basis, but have not taken steps to incorporate it into their regular work processes.

The questionnaire gave nonusers a checklist for noting reasons why they had not adopted ForeMost as an information work tool. Among the 15 respondents, a majority (10) report being happy with their previous filing system and about half (7) find filing in ForeMost too difficult and time consuming. Varied other reasons checked by multiple respondents included lack of critical mass (their co-workers are not using the system), not wanting to spend time re-filing older documents in ForeMost, and having little confidence about being able to find documents filed there.

Users of ForeMost (including infrequent as well as regular users) were asked some additional questions about its role in information work practices. When asked whether it is clear whose responsibility it is to save electronic records in varied group work situations, the mean answer was just above the intermediate point (3.4) on a 5-point rating scale (where 5 = very often and 1 = rarely or never). Users were also asked how easy or hard it is to locate an electronic record that a co-worker has filed in ForeMost. On a 5-point rating scale (where 5 = very easy and 1 = very hard), the mean response was just below the mid-point (2.6); a comparable question asked in the baseline survey about ease of locating electronic material stored by co-workers in the pre-ForeMost environment yielded essentially the same mean (2.7). As a last item in this section, users were asked how well or poorly, from their own perspective, ForeMost organizes electronic records. Here the mean response was about at the mid-point between "works well" and "works poorly" (2.9).

Satisfaction with ForeMost Functions and Features

The following section of the final questionnaire sought evaluative reactions to specific functions and features of the ForeMost software. The itemized list was developed with input from pilot project team members and supplemented with items singled out for attention by users interviewed as part of the interim evaluation. Participants were asked to rate their satisfaction with the listed ForeMost capabilities on a 5-point scale (where 5 = very satisfied and 1 = not very satisfied); however, they were instructed to skip functions and features they did not use. The responses, ranging from 10 to 17 in number per item, are summarized in Table 10.

Table 10

Satisfaction with ForeMost	Mean	Standard Deviation
Filing a single GroupWise message	3.5	1.4
Filing multiple GroupWise messages	2.9	1.5
Filing a Word document	3.3	1.2
Filing an Excel spreadsheet	3.0	1.3
Filing a Power Point presentation	3.3	1.6
Filing other electronic records	3.2	1.3
Using defaults in the document profile	3.2	1.7
Using the basic search	3.0	1.4
Using the advanced search	3.4	1.5
Accessing co-workers' documents	3.0	1.5

Retrieving documents	3.2	1.3
Distributing documents to groups	2.8	1.5
Updating documents	2.5	1.4
Managing version control	2.2	1.3
Using Personal Selection Lists	2.8	1.5
Secure long-term retention	3.7	1.3
Overall functionality	3.2	1.3

Among the users of ForeMost's varied functions and features, assessments generally cluster closely around the mid-point between satisfaction and dissatisfaction. A positive exception is users' relative satisfaction with ForeMost's capability to assure the secure long-term retention of electronic records (mean rating = 3.7). On the negative side, users expressed relative dissatisfaction with ForeMost's support for managing version control (mean rating = 2.2). Both functions would be regarded as success-critical requirements for RMA software. Not surprisingly, the assessment of ForeMost's overall functionality is solidly mediocre (3.2), as shown in the last row of Table 10.

ForeMost Impact Evaluation

A closing section of the post-pilot questionnaire sought participants' judgments about the impact of the RMA software on the DMB business processes in which it was implicated. It also solicited their views on the disposition of ForeMost at the conclusion of the year-long trial use period.

The justification for introducing new computer-based technologies into information-intensive business processes is to improve their effectiveness and efficiency, often by providing capabilities not available or not well supported by previous systems. Although their implementation requires learning new techniques and practices and inevitably disrupts established routines for some period, these short-term problems are expected to be outweighed by long term performance benefits. The final evaluation questionnaire thus included a series of statements about ForeMost in the context of DMB's business processes. Pilot project participants were asked to indicate the extent to which they agreed or disagreed with each statement if they were "in a position to observe the effects of using this software on the business processes" of their own work or the work of their unit. Responses, ranging from 17 to 20 per statement, were collected on 5-point rating scales (where 5 = strongly agree and 1 = strongly disagree). They are summarized in Table 11.

Table 11

ForeMost Effects on Business Processes	Mean	Standard Deviation
ForeMost improves the way we do our work	2.7	1.3
ForeMost makes work faster, more efficient	2.5	1.4
ForeMost does not provide major new capabilities	2.8	1.3
ForeMost saves paper	3.1	1.5
ForeMost saves storage space	3.5	1.2
ForeMost is a burden with no clear benefits	3.1	1.4

ForeMost meets legal electronic records needs	3.8	1.1
ForeMost is very different from what was expected	3.7	1.1

What is perhaps most notable about the responses in Table 11 is the absence of any strong agreements or disagreements. The first two rows in the table represent ForeMost improvements to business process effectiveness and efficiency, respectively; both statements receive weak disagreement. There is somewhat more agreement with the ideas that using ForeMost saves paper and saves storage space, while meeting legal needs for maintaining electronic records receives the strongest endorsement of all the statements (mean = 3.8). Respondents for the most part, then, are fairly neutral with respect to statements about whether the burdens imposed by ForeMost are outweighed by any new capabilities and benefits it may afford. In any case, ForeMost appears not to be very much like what participants had envisioned when they enlisted in the RMA software pilot project.

The last question in the final evaluation survey therefore reminded participants that the purpose of a pilot project is to learn about the usability and effects of a proposed new software application "before deciding whether and how to roll it out more broadly." Given that the RMA pilot period was nearing its end, they were asked to give their own judgments about the final fate of ForeMost at DMB. Their responses are presented in Table 12.

Table 12

Final Pilot Trial Judgments	Frequency	Percent
I'd be happy to see ForeMost go away	7	26.9
I wouldn't miss ForeMost if it were taken away	8	30.8
I'm neutral	6	23.1
I find ForeMost helpful – I would miss it if it went away	0	0
I'd be upset to lose ForeMost – I depend on it	4	15.4
No response	1	3.8
Total	**26**	**100**

In view of the relatively lackluster assessments of ForeMost's functions and features as well as its effects on the performance of DMB's business processes, it is not surprising that few pilot project participants (only 4) would be upset by a decision not to institutionalize the software. Of the 25 respondents to the question, a sizeable majority would not miss it and the remainder were neutral about its fate. A similar question asked at the close of the interim evaluation study had yielded a fairly even balance between positive and negative reactions to a hypothetical post-pilot decision to terminate ForeMost use. It appears that judgments became more negative as experience with ForeMost increased. An alternative explanation might be negative response bias among the small sample of participants responding to the final survey. On the other hand, it is likely that those who took the trouble to respond to the post-pilot questionnaire were among those most positively disposed toward RMA software. There is little ground, then, for questioning the overall negative evaluation of ForeMost based on the year-long trial experience.

DISCUSSION

The pilot project discussed in this report set out to introduce and systematically evaluate RMA software—ForeMost—on a trial basis in one state Department. Lessons learned from that effort are well worth reviewing, for at least two reasons. First, state agencies will be engaged in adopting and adapting to new computer-based technologies for the foreseeable future, so learning from experience about how to manage those activities should have long term pay-offs. Second, organizations accountable to the public—such as state agencies—will have to develop viable approaches to electronic records management in the near term whether or not the marketplace offers software packages that provide high-quality support for those functions.

Although ForeMost is one of only two leading software applications specifically designed to meet digital records management requirements, its introduction into the work of a subset of DMB units met with little success. This outcome appears to be largely attributable to the present state of the RMA software art, rather than to failures of organizational support or to weak implementation efforts. (Some large organizations with well-staffed internal technical units have avoided RMA software packages, electing instead to build at least temporary records management solutions into other general purpose software or modifying workflow technologies to serve these purposes.) The discussion of lessons learned from the pilot project is ordered in four categories below, reflecting the conceptual framework that guided the evaluation research

design. Briefly, that framework views outcomes of technological innovation attempts as a function of three classes of factors: characteristics of the new technology itself, the organizational context into which it is being introduced, and the implementation processes.

Technology

As indicated earlier, users found the software tedious to use even to carry out the simplest of tasks. For instance, especially in the initially installed version, ForeMost required users to perform a long series of steps just to file a single message in the appropriate folder, and it did not offer a way of filing a batch of messages into the same folder with a single set of operations. While a subsequent version reduced the number of distinct steps involved in filing, it remained much more cumbersome than the drag-and-drop approach to filing one or more messages offered by the office suite then in use (GroupWise). Additionally, the first version of ForeMost required different operations for filing different kinds of electronic records (e.g., PowerPoint presentations vs. Word documents) and was not Web-accessible (precluding use from home or remote sites).

These technical shortcomings were not alleviated until after the mid-point of the year-long trial. And no mechanisms were ever provided to facilitate the transfer of backlogs of already stored files into the newly established ForeMost folders (so users had to rely on both systems for retrieving and reusing saved digital material). Finally, effective use of ForeMost for electronic records management functions would be heavily dependent on widely shared norms (regarding, for example, whose responsibility it is to save which records in specific contexts, how updating of shared documents should be arranged among group members, and so on); but given the small number of users and their limited engagement with the technology, such communities of practice did not emerge during the pilot period.

The account above is illustrative (although not exhaustive) of technical barriers to the successful deployment of ForeMost. The question to ask is what, if anything, could have been done differently to reduce such barriers. Although the project team could not directly modify the software, it succeeded in getting the vendor to make some changes that improved its usability over time (see above). In future efforts to introduce new software, this experience suggests the value of having a usable version of the software (vs. a demo version) up and running within the pilot project team environment for a long period well before the expected roll-out.

Such a period of real internal use would enable the project team to get to know the software really well, and to work with the vendor as well as the DMB technical staff to make interface improvements and facilitate integration of the new application with existing software tools. Further, the team would have time to develop and try out work-arounds for problems that couldn't be fixed by software modifications. Ideally, this pre-pilot use period would also permit superusers to be selected and trained well ahead of software roll-out to their units.

Organizational Context

Qualitative material collected during the baseline evaluation surfaced concerns that DMB might be a "change resistant culture," where employees would be likely to oppose efforts to introduce new technologies. Background survey data indicated that DMB employees slated to take part in the pilot project, on average, had worked for the State for over 20 years; they varied widely in computer experience, and many did not have education beyond high school. These context characteristics have sometimes been associated with change resistance in previous research on technological innovation. However, there is no evidence in either quantitative or qualitative evaluation data that these context characteristics had a negative influence on outcomes of the ForeMost pilot project. On the contrary, targeted participants appeared to take a genuinely open experimental stance toward the new software, resting their usage decisions on the perceived advantages it afforded in relation to their information tasks. In particular, some participants with

the longest tenure and least computer experience became the strongest supporters of ForeMost—because of the direct benefits it yielded for their work.

Another context factor implicated in previous studies of organizational innovation has to do with ownership and support for the new technology. On the one hand, pilot project participants believe it is good when a new application is sponsored by business units rather than centralized technical units (since the latter may be more influenced by technical features than by business process goals). On the other hand, the Records Management Division had the reputation of being excessively rule-bound and controlling. But by the interim evaluation, qualitative data made it clear that the Division's new management had largely overcome that image, and the pilot project team was generally regarded as accessible, open to suggestions, and facilitative rather than controlling. However, the extent of top-level DMB management commitment to the importance of the RMA pilot trial was indeterminate. Participants on the whole perceived everyone from the Governor's office on down to be strong advocates for the use of advanced technology to improve the performance of state missions. Yet there was not evidence of continuing and visible support from the top for this particular pilot project during the trial period.

A final context factor to consider—one specific to this project—concerns the development of a culture of electronic records management. Such a culture was nonexistent when the pilot trial started and is now only in its infancy. This condition is not unique to DMB—as the introduction to this report notes, many large organizations are only just beginning to come to terms with electronic records management. Yet in networked digital environments, and especially when organizations are accountable to the public, employees in varied job roles and levels need to understand what records are and what responsibilities they have for their management.

But "record" is not an easy concept to grasp, and is particularly daunting in the context of interactive digital media. At the end of the year-long trial, as the quantitative data reported above indicate, a majority of pilot project participants did not have a clear understanding of what an electronic record is or of their own responsibilities regarding their retention. Further, the confusion extends high up in the state hierarchy, where the Michigan attorney general contends that e-mail sent or received in the course of sate business constitutes a record; but the state CIO and the DMB director do not agree. A clearly formulated digital records policy for state entities—even a provisional one—would be highly desirable. It should help engender communities of practice within which software-supported electronic records management could flourish.

Implementation Processes

Research literature on technological innovation suggests that lack of attention to and investment in implementation processes are among the leading reasons why newly acquired technologies do not take hold. The RMA pilot project described here is a clear counter example. For instance, the project team did research on available RMA software, visited other sites where ForeMost had been installed to talk with users (inviting other division managers on some of these trips), held informational meetings, and acquired demo software. Then, in advance of installation of ForeMost, team members scheduled appointments with pilot project participants to assist them, one-on-one, in the development of file plans. While preparing the file environment for the transition to ForeMost, these sessions provided project team members with detailed knowledge of the prospective users' information handling practices.

Initial group training sessions once the software arrived got mediocre evaluations from participants. As the interim evaluation suggests, the sessions suffered from the usual flaws. Introductory training is just that—users don't find out what they really need to know until they are back in their offices trying to use the application to accomplish their own tasks. In contrast, individualized coaching from project team members at users' own desks received rave reviews.

Proactive help—meaning help initiated by project members without a help call—was especially appreciated. Typically users only call for help when they're having an immediate problem; they rarely call to learn whether there are ways they could improve on routines they've devised that don't break down. To promote learning and help users better exploit ForeMost capabilities, project team members made unsolicited calls to see whether users might benefit from a follow-up session (e.g., "I'll be in your building today—is there anything I can stop by and help you with"). Such implementation efforts help prevent users from ending their progress at the lowest levels of the learning curve and boost their positive outcomes. Follow-up coaching and proactive help along the lines instituted by the ForeMost pilot project team should be treated as best practice models and recommended to support the implementation of any new software tool.

Finally, there appear to be two areas where implementation processes might have been strengthened. As mentioned above, had the software been acquired earlier for use within the project team, it might have been valuable to have highly trained superusers in the participating units before those units were introduced to ForeMost. Although project team members were users' first choice of help to resolve difficulties with the application, knowledgeable co-workers came in as a strong second choice. So it would be good to assure the availability of at least a small number of knowledgeable colleagues from the outset. A second area has to do with user involvement in all phases of the project. Users found, to their satisfaction, that they had a great deal of input into their file plans. Further, the frequent ForeMost-related communications from the project team (via the listserv and the user guides) were much appreciated. But users did not perceive themselves as having been very much involved in the selection of the software or the design of the pilot project implementation. In future implementation efforts, it would be well to consider how to provide meaningful early opportunities for user involvement.

Outcomes

As explained above, pilot projects are intended to yield an informed basis for predicting whether a given technology will succeed in an existing context before an organization-wide go/no-go decision is made. So it is worth revisiting, in the context of this pilot project, how successful outcomes were construed.

Three sorts of interrelated outcomes were envisioned in the original evaluation plan. They include use (represented as the proportion of intended RMA software users who become actual users); user satisfaction (with specific features of the software as well as its overall functionality); and demonstrably positive effects on the business processes the software's use is expected to support. The three sorts of outcomes are interrelated in that, without usage, neither of the other outcomes can emerge and be meaningfully assessed.

As is evident from the final evaluation data, ForeMost did not engage a critical mass of users. Among the respondents to the post-pilot survey (26), less than half (11) used the software as often as once a month; and among them, only 4 said they actually had come to depend on the application for getting their work done. Further, among both its regular and occasional users, the software's functions and features received only modest endorsements at best. For instance, the highest rated capability—assuring secure long term retention of records—received just a mean rating of 3.7 on a 5-point satisfaction scale. Judged effects on business processes were equally lackluster, with the most positive—meeting legal accountability requirements for electronic records—achieving a rating of 3.8. Actual rather than perceived effects could not be measured, both because of the lack of a critical mass of users and because business processes in DMB had changed from the pre- to post-pilot period as a function of departmental restructuring.

It is worth underscoring that use of RMA software is voluntary, in the sense that primary task functions (such as preparing, sharing and storing official documents, updating them while maintaining version control, and searching for and retrieving them later on) can be performed

without it. In this sense it is unlike some computer-controlled processes where doing the work entails using the technology. In voluntary situations where, as one baseline interviewee put it, participants "can vote with their feet," use per se becomes the most important outcome measure. In such situations, two results from decades of research on technological innovation should be underscored: widespread incorporation of new tools into existing work processes depends on their being perceived by users to fill an experienced need or on their offering a tangible improvement to users over previous work methods. In the context of DMB's information intensive business processes, ForeMost satisfied neither criterion for most users. The pilot trial itself, however, should be regarded as successful in yielding instructive lessons for future software deployment efforts at DMB. A host of literature on failed large-scale information system deployments suggests that the costs of experimental learning are small compared to the costs of bad organization-wide decisions.